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## **A Proposal for a Rwanda Potato Sector Development Program**

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**Prepared by Charles C. Crissman  
for the Government of Rwanda**

**August 2002**



Organized by Abt Associates Inc., with financing from the US Agency for International Development, and the Africa Office of the International Potato Center. Charles Crissman is an economist and Regional Representative for the International Potato Center, Sub-Saharan Africa Region, Nairobi, Kenya. The Potato Sector Committee of MINAGRI invited Dr. Crissman to prepare this action plan.



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## Preface

The Government of Rwanda is developing policy for rapid agricultural growth within the context of its Poverty Reduction Strategy Paper (Government of Rwanda, 2002). The Ministry of Agriculture, Animal Resources and Forestry (MINAGRI) identified potato as one of the priority crops to lead the intensification and transformation of the agriculture sector (GoR, 2000). Policies of the government must attend to priority needs identified by the government and validated by stakeholders. The Agricultural Policy Development Project (APD) in MINAGRI assists the Minister and other ministry leaders by facilitating information gathering, analysis and discussion. This document provides specific suggestions for a five-year plan to support the rapid development of the potato sector in Rwanda.

The APD project sponsored a series of events that led to the presentation of this document. First, Dr. Frans Goossens was contracted to study the Rwandan potato sector with special emphasis on the seed potato, potato marketing and the potential for export of ware and consumer potatoes in the regional market (Goossens, 2002). Second, a public workshop attended by 45 potato sector stakeholders was held in November 2001 to discuss his findings. Third, in a series of meetings, the MINAGRI Potato Sector Committee discussed the findings, approved the Goossens study, and requested that the International Potato Center assist in the development of a potato sector development program to convert the recommendations of the Goossens report to concrete proposals for activities.

Fourth, a public hearing attended by 25 public and private sector stakeholders on August 6 deliberated the recommendations of the Goossens report. The author combined the information from the Goossens report and the comments from the stakeholders to propose a set of activities that could constitute a potato program for the country. During the following days, the activity plan was discussed with numerous individuals. In particular, it was vetted at a meeting attended by 16 potato sector leaders of Ruhengeri and Gisenyi Provinces in Ruhengeri Town on August 8. Fifth, the contents of this paper were presented and discussed during a public hearing in Kigali on August 14.<sup>1</sup>

Once the government endorses the potato sector development program, the next steps are for the relevant public and private sector actors to prepare specific proposals to fund specific portions of the program and present these to the government or interested donors. This document was prepared with numerous and broad-ranging consultations with groups and individuals. This document purports to convey the shared opinions of those many voices.

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<sup>1</sup> A list of participants in the hearings is available from the office of the Secretary General of MINAGRI.

## Acronyms and Abbreviations

|          |   |
|----------|---|
| APD      | Agricultural Policy Development   |
| ASARECA  | Association for Strengthening Agricultural Research in Eastern and Central Africa   |
| BAIR     | Bureau d'Appui aux Initiatives Rurales (Office to Support Rural Initiatives)  |
| COODAF   | Coopérative de Développement Agricole, Elevage, Foresterie, Epargne et Crédit au Rwanda (Cooperative for the Development of Agriculture, Livestock, Forestry, Savings and Credit in Rwanda) |
| FOR      | Forum des Organisations Rurales (Forum of Rural Organisations)  |
| GoR      | Government of the Republic of Rwanda  |
| Ha       | hectares  |
| IMBARAGA | "Force" in Kinyarwanda (Co-operative of farmers and livestock rearers)  |
| ISAR     | Institut des Sciences Agronomiques du Rwanda  |
| MINARGI  | Ministry of Agriculture, Animal Resources and Forestry  |
| MT       | metric tons   |
| PDMAR    | Agriculture and Rural Market Development Project  |
| SISA     | Système d'information sur la Sécurité Alimentaire   |
| SNS      | Service National Semencier (National Seed Service)  |



## Introduction

The Poverty Reduction Strategy Plan of the Government of Rwanda identifies rural development and agricultural transformation as its number one priority. MINAGRI classifies potato as a priority crop for development and one that can serve as an example to the rest of the agriculture sector of how rapid transformation can take place (Government of Rwanda, 2000). With 57,000 ha under cultivation, the potato sector is a large and dynamic segment of agriculture. Hundreds of thousands of Rwandan farmers across the country are engaged in commercial and subsistence cultivation. Rural and urban-dwelling Rwandans like to eat potatoes and, as a result, the per capita consumption of potatoes is among the highest in the world (Nyarwaya et. al., 2002). Given population growth rates, urbanization rates, and consumption preferences, demand for potatoes in Rwanda is expected to increase by 200-250 percent by the year 2020 (Mellor, 2002). Favorable ecological conditions concentrate production in the two northwest provinces, Ruhengeri and Gisenyi, but many potatoes are grown on poor acid soils. Consequently, the national average yield is one of the lowest in the world at 7MT/ha.

The problems and opportunities of the potato sector are well described in various reports. Goossens (2002) synthesizes many earlier reports and offers a series of recommendations regarding potato inputs, production, transport, marketing, and the potential for processing and export.

The agriculture value chain provides a logical framework to convert these recommendations to an action plan for the potato sector. A suggested example of the Rwanda potato sector value chain is given in the figure at the end of this document.

## Agriculture Value Chains

The agriculture value chain or filière (Raikes, Jensen, and Ponte, 2000) consists of three parts: the groups of actors, the linkages among the actors and the support environment. As illustrated in the figure, the actors are grouped by logical stages in the chain. The downward arrows illustrate a hypothetical product flow from the input suppliers to the final consumers. The farm input suppliers provide such things as varieties, seed, fertilizer and agrochemicals. Farmers obtain what they need from them and produce the crop. Depending on their particular production zone, the farmers may store all or part of their harvest, sell it immediately to transporters, or sell directly to local consumers. The transporters provide the connection between the producers and markets outside of the production zones. Markets are the connection between supply and demand. Wholesalers and retailers add value to potatoes by making them easily available to consumers in the place, time and amounts they wish to buy. Though there are no processors in Rwanda at the present time, they can convert the potato into a variety of products such as starch, chips or crisps.

The upward arrows illustrate the flow of Rwandan francs back along the chain. Variations of this standard chain may result in linkages that skip actors. For example, some farmers may directly sell their crop to their neighbors as final consumers.

Outside the chain are the set of physical and institutional elements in which the value chain operates. These elements include policies of the government such as credit, communication, rural infrastructure, private sector investors, the legal environment, market information and agriculture

research. Both the government and private sectors provide important actors and influence the environment for the potato value chain.

### **Six Characteristics of Value Chains**

The first characteristic of value chains is value creation. Each group of actors adds value to the final product that reaches consumers. Farmers combine their farm and purchased inputs to grow potatoes. Transporters move those potatoes from the producers to the market. Wholesale marketers distribute the potatoes to retailers. Retailers make the potatoes available to consumers. This sequence is the second characteristic of the value chain as characterized by arrows indicating the product flow. The financial flow also illustrated in the figure is the third characteristic. The fourth characteristic is the flow of information. The value chain transmits many kinds of information. The most obvious kind is price but information about preferences of variety, quality and preferred delivery times are also examples of information flow.

Value chains form in response to a drive to become more efficient, control costs, reduce risk and respond to consumer demands (Boelhje, Hoffing, and Schroder, 1999). In developing countries, potato value chains typically remain loosely aligned until a dominant actor demands a consistent product delivered in a consistent manner. This is often a potato chip or crisp processor. For technical and cost reasons, a processor demands potatoes of the same variety with consistent quality characteristics delivered in a pre-arranged schedule. Once formed, the value chain can also provide incentives to the groups of actors to participate in the chain. Examples of these incentives include market access, production contracts and access to credit or technical information.

The final characteristic is governance. In many instances, the value chain is self-governing. Mutual self-interest can often be sufficient to promote cooperation and collaboration. In some cases, a single actor or group of actors can impose a structure on the value chain. An example comes from the international coffee value chain. Starbucks Coffee, an international retailer with stores in Europe, Asia and North America, controls a value chain for a line of organic coffee that it brews and sells in its retail outlets. Starbucks, the retailer, through contracts and other conditions, governs the inputs, production, and transport and processing of the coffee it purchases. In potatoes, the processor is often the first actor to emerge in a governance role. Notably, important parts of the potato value chain remain loosely organized while a sub-sector begins to organize for a specific market.

### **The Rwandan potato value chain**

A basic characteristic of the Rwandan potato sector is its lack of organization and low level of productivity. The individual elements suffer from inefficiencies and are poorly connected. The paragraph below offers a selection of examples of problems for each of the individual groups of actors.

Among the input suppliers, there are inappropriate varieties, very limited supply of good quality seed, limited access to fertilizer, and poor distribution of all of these items into the rural areas. As mentioned above, potato yields are among the world's lowest. Potato farmers manage crop harvest inadequately, resulting in high perishability. Transport from the farm to the road network is difficult and once on the road, the very small average offer by an individual makes purchase by traders inefficient. Traders generally operate small to medium-size trucks that increase the costs of delivery. Several of the wholesale markets are characterized by their limited price competition and most have

inadequate facilities. As a result, the consumer is offered just an average quality potato when there are several niche markets that could be exploited to return higher profits. There are several initiatives for developing large-scale processing but none are yet financed. Market price and quantity information is partial and sporadic. In general, knowledge of market opportunities is incomplete. Despite their co-dependency, the groups of actors typically do not know each other and have never cooperatively worked together for the advancement of the sector.

## **The Potato Sector Development Program**

The program consists of four sub-programs. First, is a sub-program to strengthen the potato value chain. The second sub-program is a set of activities to improve the offer of potato varieties and seed to farmers. The third sub-program focuses on the farmer. The fourth and final program improves the performance of the potato markets. The sub-programs are presented in summary form below. More complete details of the set of recommended sub-program activities are given in the appendix.

To maximize the potential for poverty reduction, the overall focus of the program is to solve the problems of farmers. Farmers constitute the largest group of actors in the potato value chain and are the poorest. To maximize the potential for sustainable impact, the program also emphasizes training for agriculture professionals that work with the potato sector and for local technicians and farmers. The sub-program activities can all be started quickly and can produce quick results. None of the suggested sub-program activities are excessively complex nor do they require large capital investments. The combination of these factors assure a high probability of success.

The activities promote the delivery and use of *input-based technologies* such as varieties, fertilizer and seed and *knowledge-based technologies* such as crop management, integrated pest management, harvesting and marketing practices. Potatoes respond extraordinarily well to improved inputs. In optimal conditions, potato yields can exceed 40MT/ha, more than five times the national average in Rwanda. However, potato production requires sophisticated management. Good management combined with good inputs are essential to achieving significant yield improvements. Average yields can reach 14 MT/ha upon the completion of this program.

The suggested five-year program is below. All activities would start immediately upon approval and financing and should produce final results within five years.

This is a sector-based program. It is not a comprehensive, economic development plan nor a broad agriculture sector program. As such, certain topics that may impact on the progress of the potato sector are not treated. They may be important and several are noted but not addressed. A common theme in many of the suggested programs is training. Training for farmers and other participants in the value chain is highlighted as well as training for government professionals that serve in agencies that provide support to the potato value chain. An important supposition is that these agencies can effectively implement their assigned tasks. Clearly, some departments are more capable than others. This action plan assumes that other programs of the government strengthen and improve the performance of all government departments and agencies.

This is a plan to develop the national potato sector. Stakeholders that may participate in the implementation of this plan come from a wide range of domestic, public and private agencies and institutions. There is also a broad range of regional and international stakeholders interested in and

possibly willing to support the successful implementation of this plan. The Government of Rwanda participates in or is a member of many such organizations through representation by relevant agencies. For example ISAR is a member of ASARECA, the regional grouping of agricultural research and extension agencies. As a member, ISAR and the potato sector can participate in programs of ASARECA that can support research and technology transfer. The International Potato Center, a Future Harvest Center of the Consultative Group for International Agricultural Research, through its mandate is also concerned with the successful implementation of this action plan. This action plan recruits support from both domestic and international collaborators.

The goal of this action plan is to stimulate an annual production growth rate of about 15percent from the potato sector during the five-year planning period (Goossens 2002, Mellor 2002). Most of the growth will come from increasing yields; little should come from increasing area. This growth rate is extraordinarily high and reaching it depends on several key suppositions. Most important is the timely implementation of programs whose goal is to supply steadily increasing amounts of inorganic fertilizer to potato farmers. A significant start on the improvement of rural infrastructure, particularly farm-to-market roads, is also an important assumption. Continuation of peaceful conditions in the countryside and normal weather are additional preconditions to the success of this action plan. The action plan promotes export of ware and seed potatoes. A final assumption is that these export markets remain open to potatoes from Rwanda.

### **Impact of the action plan**

Among the major food and industrial crops in Rwanda, potato requires the largest labor input. In Rwanda a hectare of potatoes requires an estimated 120 labor days in land preparation, crop establishment, crop management, harvest and transport to the initial selling point. In contrast a hectare of wheat requires about 50 labor days. Using the 2002 area estimates, potato cultivation creates about 6.2 million labor days in rural Rwanda. Though the labor is spread over many more individuals, for perspective, 6.2 million days is full-time employment for 31,000 people. Because potato cultivation is management intensive, as yields increase, the labor requirement will also increase, growing to about 150 labor days. Sustaining the potato sector is among the most effective rural employment programs that the Government of Rwanda could devise.

Potato production produces more income per area than any other major food crops in the country. This is critical for the small-size farms that characterize Rwanda's rural economy. Mellor (2002) and Mellor and Ranade (2002) show that most of this income remains in the rural sector by increasing the demand for rural non-farm goods and services. This translates into income growth for those rural residents engaged in non-farm activities.

The program development sequence follows the steps below.

Rwanda PRSP:

- "Rural development and agricultural transformation" is the number one priority for action. (GoR, 2002)

Policy objective:

- Improve the welfare of potato-farming families, rural agriculture workers and potato consumers by improving the productivity of the sector and its ability to produce good quality potatoes at an affordable price while protecting the environment.

Policy problem:

- The potato sector is poorly organized. This results in low levels of productivity and slow response to policy stimulation (Goossens, 2002).

Policy challenge:

- Stimulate the organization and transformation of the potato sector through key interventions.

Design the program:

- Identify the key interventions. Define the who, what, when, where and budget to implement the interventions.

### **Sub-program 1: Stimulate the organization of the potato value chain**

Value addition is the most fundamental characteristic of the activities of the groups of actors in the value chain. In agriculture, much of the final value is added after the crop leaves the farm. This leaves the farmer poorly positioned to reap the benefits of a better-integrated value chain. Since farmers are the most important client group for the poverty reduction goals of the government, special attention should be paid to the potential for innovative value addition practices that can be captured by farmers. Adding quality characteristics such as pre-harvest curing to improve storability and size grading are among those practices that can add value while the crop is still on the farm.

Most of the six characteristics of the value chain involve interactions among actors. Information flow among the actors is frequently mentioned as a problem. Impediments to these interactions can seriously affect the performance of the value chain.

#### ***Activity 1.1: Value-chain improvement***

This activity will improve the level and quality of interactions in the value chain. This program would hire a value-chain development specialist to reside in Rwanda whose job would be to facilitate the formation and consolidation of groups of actors, facilitate their interaction and improve the performance of this chain. With collaborators, the specialist would seek opportunities for value-chain actors. The specialist would also seek to identify problems and assist their prompt solution. This program would start immediately and continue until the value chain is well established and running independently.

The output of this activity would be the achievement of a set of target indicators related to value-chain integration, performance and participation.

#### ***Activity 1.2: Potato market price information system***

This activity will improve price information movement in the potato value chain. Building on the existing market information system maintained by SISA, this program will design a potato specific information collection, analysis and dissemination system that will optimally serve the actors in the potato value chain. Prices will be broadcast by radio spot announcements on a daily basis.

The output of this activity would be a functioning system to collect, process and diffuse daily price data by potato variety from selected important markets.

## **Sub-program 2: Improve the varieties and seed offered to potato farmers**

There is a stated need for improved potato varieties that meet present and future projected needs of the fresh and processing domestic demand as well as the demand of seed and ware export markets. ISAR and SNS are the suppliers of this input.

### ***Activity 2.1: Accelerated potato variety selection and release***

This program will aggressively introduce new germplasm materials into the country and rapidly screen them with farmers while simultaneously starting seed multiplication of probable releases. Normal variety selection procedures take up to 7 years to screen introduced material and identify and release a new variety. No provision is made for making seed available at the time of release.

The output of this activity will be five new varieties named within five years with 100 MT of basic seed of each new variety available for seed multipliers at the time of release.

There is a stated need for increased quantities of improved quality seed of a number of different potato varieties. ISAR, SNS and farmer associations are the suppliers of this input. The proposed seed law (GoR, 2002) is an importing element of the supporting environment for the development of the seed sector. This seed law needs financial support for implementation.

### ***Activity 2.2: Increased production of basic seed***

This activity will support increased production of foundation and basic seed by ISAR and SNS. The foundation program will review and improve rapid multiplication techniques and increase the quantity produced to meet growing demand. The quality of foundation and basic seed production will be improved through installation and implementation of quality control practices consistent with the new seed law. Both ISAR and SNS will introduce an enterprise basis for production. The business approach will emphasize efficient production and effective marketing. A production manager will assure that production goals are met and that seed is produced at the lowest possible cost.

As the output of this activity, ISAR and SNS will combine to produce a total of 4,800 MT of basic seed for the varieties demanded by Rwandan producers within five years. When multiplied one additional time as per the present seed scheme, this amount represents the seed requirements for 15percent of 2002 area.

### ***Activity 2.3: Increased production of certified seed***

This activity will support production of certified and quality declared seed by farmer seed producer associations. This program will train farmer multipliers and provide institutional and organizational training for seed grower associations. A special emphasis will be on business plan development for growth and seed marketing. Farmers buy seed as an investment that should provide returns over several production cycles. Seed degeneration rates measure the speed at which certified seed declines in yield until it is no better than common unimproved seed. Seed degeneration rates are thus important indicators of the potential size of the seed market. Lacking such studies and considering the environment of the production zones, we assume a six-year replacement cycle.

The output of this activity will be at least five viable farmer seed grower organizations that produce and market at total of 19,000 MT of certified seed. This is sufficient seed for every potato farmer in Rwanda to renew his farm stocks every six years based on 2002 planted area.

***Activity 2.4: Pilot implementation of the new seed law for potato seed production***

This activity shall support the implementation of the new seed law for quality control and certification in the seed potato sector. This program will train SNS professional and technical staff, acquire the necessary quality testing equipment, assist the development of practices and procedures for certification and promote the benefits of the seed law among seed growers and consumers.

The output of this activity will be timely and complete services offered to 100percent of the clients that submit foundation, basic and certified seed for inspection.

There is a stated need for increasing the use of fertilizer by potato farmers. Its timely delivery and widespread use is important for the successful implementation of the potato program. Given that there is a separate fertilizer sector action plan in development (Desai, 2002) the potato sector development program makes no recommendation in this arena.

There is recognition that fungicides and insecticides can contribute to improving crop yields. Fungicides, in particular, are a key element of late blight control. As farmers' incomes improve they may begin using pesticides more frequently. Insecticides can be highly toxic and exposure can result in death or injury. Farmers should be educated about the consequences of pesticide exposure. The farmer training activity recommended below includes IPM training.

**Sub-program 3: Farmer training and support**

There is a need for farmer training to improve crop productivity and farm management, especially to alleviate poor crop rotations. The availability of fertilizers will facilitate intensification of production. This implies that already overused soils are in danger of being mined for the characteristics that make them productive. In the long run, this will reduce productivity further. Several well-recognized crop management practices reduce yield and quality of the harvested crop. Most farmers plant seed saved from their previous harvest. This seed is generally of poor quality. There are disease management and storage practices that can improve the quality of self-produced seed.

Several organizations and programs serve potato farmers, especially in the Northwest. These include the program to promote potato farmer associations of the Department of Extension and Marketing of MINAGRI (GoR), the national farmers union, IMBARAGA, and regional associations such as BAIR, FOR, and COODAF. The strategic partner for Activities 3.1, 3.2 and 3.3 is the Agriculture and Rural Market Development Project (PDMAR). There is a need to strengthen the management and administration of these organizations, as well as the finances and services they can offer farmers (Their technical competence in potato crop cultivation is of particular importance).

Lack of production credit was cited as a problem that severely limits the ability of potato farmers from utilizing improved inputs purchased from off the farm. We recognize that potato production is relatively more risky than many farm operations; this makes production credit problematic (see Activity 3.3).

### ***Activity 3.1: Farmer Training***

This large-farmer training activity shall emphasize four elements: soil management, potato crop management, on-farm seed potato management, and integrated pest management. This program should be a component of PDMAR. The training should target farmers that are members of farmer associations and should be weighted towards farmers in the volcanic soil potato zones of the Northwest.

The output of this activity is 40,000 potato farmers trained in the above subjects within five years. For maximum impact and rural skills transfer, this training program should be conducted using participatory techniques that emphasize the training of farmer trainers.

### ***Activity 3.2: Improved management and services from farmer organizations***

The farmer organization strengthening activity shall work with all farmer organizations and provide training and counseling in organizational management, administration and staff training in technical aspects of potato production and marketing. This program should be a component of PDMAR.

The output of this activity will be 100percent of staff of all organizations trained within three years.

### ***Activity 3.3: Production credit for potato farmers***

This activity should expand existing credit schemes with farmer organizations or banks or establish, on a trial basis, at least three micro-credit schemes in key locations in potato producing zones in the country. Current estimates of credit use by potato farmers suggest participation levels of less than 10 percent. This program should be a component of PDMAR.

The output of this activity will be 30 percent of farmer members of farm organizations having used credit within five years.

## **Sub-program 4: Transport, markets and processing**

There are two types of transporters: those that move the potato crop from the field to the road, and those that pick up the crop on the road and move it to the markets. An output of Activity 1.1 will be greater communication between farmers and transporters. Poor rural roads limit the ability of motorized transport to reach many potato farms. Thus field-to-road transport costs can be a significant portion of total production costs. These field-to-road transporters face problems of poorly designed and maintained footpaths. The stakeholders recommended consideration of a program to improve these footpaths. At present we do not recommend a program in this activity plan. We assume that such a recommendation will be included in other plans of the government. The road-to-market transporters were often seen as a problem but the stakeholders offered no recommendations to address this area.

Wholesale markets in various cities and in the rural sector perform poorly. The services offered to sellers and buyers is often limited and poorly coordinated. Prices are often determined through collusion. The markets generally have poor physical infrastructure.

At present, there are no potato processors operating in Rwanda. The illustration of the potato value chain, therefore, does not include them as actors. However, there are at least two initiatives to establish potato processing plants in Rwanda. These include inquiries from a Chinese company for a starch factory and an effort called Potato Enterprise supported by RSSP. We applaud these efforts, but have no specific recommendations for them. Should these initiatives become reality, an output of Activity 1.1 would be their incorporation in the value chain.

There are stated desires to develop export markets for ware and seed potatoes. The East and Central African political and economic environment is progressing to a point where regional integration and liberalized trade are serious topics of discussion. Several regional organizations in which various agencies of the Government of Rwanda participate are becoming more effective and influential. These are factors that can facilitate the development of export markets. Governments manage a wide range of instruments that can facilitate the development of foreign commerce. These include information about potential markets, trade missions to facilitate contacts, trade offices, trade credits and agents. Though all of these activities and more can help develop the potato export market these are sufficiently broad tasks that they should be treated in a multi-sectoral program to be efficient.

Consumers are the last, and probably the most important, part of the value chain. Their decisions send signals to other actors. At the same time, the other actors must communicate with the consumers to educate them about changes in the product or other aspects of the product offering. In some locales, consumer education programs have been influential in affecting total demand, establishing demand for new differentiated products and for other quality aspects. This may be an important consideration in the future but we make no recommendation during the first, medium-term planning period.

#### ***Activity 4.1: Wholesale market re-organization***

This activity will re-organize wholesale markets in Kigali and afterwards in other cities and rural sectors. This program should use appropriate social approaches to gain acceptance of the existing wholesalers to participate in market re-organization.

The outputs of this program will be improved market physical infrastructure in Kigali and other locations and improved market performance signaled by free participation in the market by any potential wholesaler and transporter within five years.

#### ***Activity 4.2: Promotion of potato processing***

This activity shall provide support for individuals or companies considering investments in potato-processing businesses. The support shall be limited to providing information about investment opportunities and potential markets. Existing business support programs provide lines of credit or technical backstopping for business plan development.

The output of this activity shall be a series of events and documents directed towards educating potential investors about the potential of the potato-processing sector in Rwanda.

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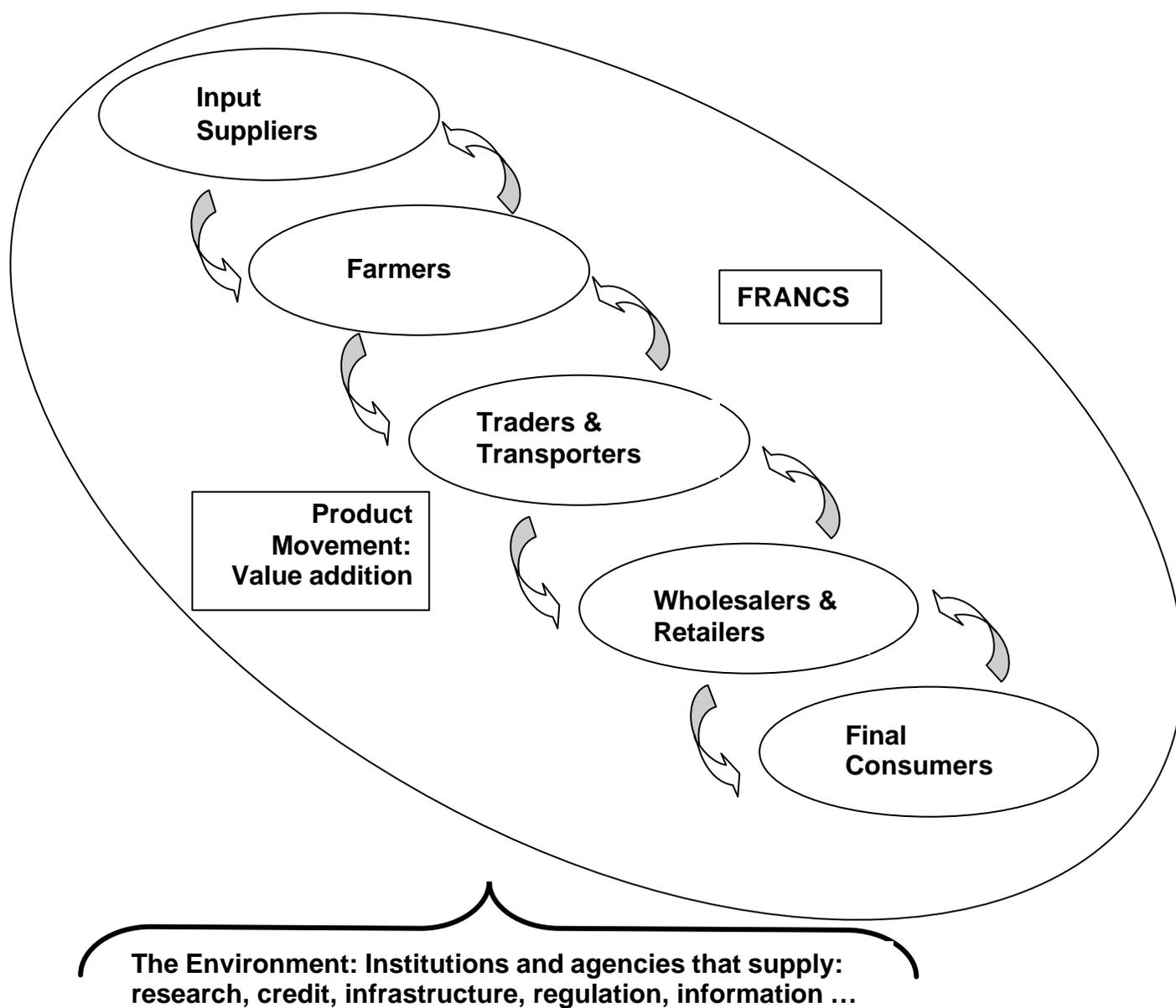
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**Figure: Agricultural Value Chain: An example for the potato sector in Rwanda**



*Three parts of the value chain*

- The actors
- The linkages between actors
- The supporting environment

*Six Characteristics of Value Chains*

- Value Creation Activities
- Product flow
- Financial flow
- Information flow
- Incentive systems
- Governance





International Potato Center

Seven farmer variety selection groups: two each from Ruhengeri and Gisenyi and one each from Byumba, Gikongoro, Kibuye

| Activity 2.1                              | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|--------|--------|--------|--------|--------|
| Introduce and multiply materials          | █      |        |        |        |        |
| First selection on-station                |        | █      |        |        |        |
| Second selection on-station               |        |        | █      |        |        |
| Third selection farmer fields             |        |        | █      |        |        |
| Fourth selection farmer fields            |        |        |        | █      |        |
| Seed multiplication of potential releases |        |        | █      | █      | █      |
| Release new varieties with seed           |        |        |        |        | █      |
| M.Sc. Training                            | █      | █      | █      |        |        |
| Monitor and Evaluate                      |        | █      |        | █      | █      |

**Activity 2.2: Increased Basic Seed Production**

Goal: Sufficient basic seed to meet the needs of the seed sector

Outputs

1. 540 metric tons of foundation seed per cycle
2. 3,400 metric tons of basic seed per cycle
3. Trained ISAR and SNS professionals

Methods:

- 1: Produce 36,000 plantlets per cycle from in-vitro laboratory at PNAP-Ruhengeri
- 2: Produce 600,000 minitubers per cycle in screenhouses at PNAP-Ruhengeri
- 3: Produce 540 MT Foundation seed after two field multiplications at PNAP-Kinigi
4. Produce 3,400 MT Basic seed after a field multiplication at SNS seed farms
5. Establish and implement a cost accounting system
4. Test feasibility of hydroponic system for minituber production
5. M.Sc. Training for two seed production specialists, one each from ISAR and SNS
6. Short course training for seed production for ISAR and SNS staff
7. Design and implement a monitoring and evaluation system

Participants: PNAP-ISAR, SNS, and International Potato Center

Methods:

| Activity 2.2  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|--------|--------|--------|--------|--------|
| Acquire equipment and increase capacity of in vitro lab | █      |        |        |        |        |
| Produce rooted in-vitro plantlets                       | █      | █      | █      | █      | █      |



### Activity 2.4: Pilot Implementation of the New Seed Law

Goal: Potato seed growers and seed buyers are satisfied with seed inspection and quality testing services of SNS

Outputs:

1. Seed inspection practices and procedures are uniformly known and applied
2. Quality testing practices and procedures are uniformly known and applied
3. High public awareness and appreciation of quality standards of certified seed.

Methods:

1. Acquire the necessary equipment to comply with quality testing procedures.
2. Design and implement new practices and procedures contained in the new seed law.
3. Train SNS personnel in inspection and quality testing procedures contained in the new seed law.
4. Design and implement a quality seed marketing program in collaboration with seed grower associations and other stakeholders.
5. Design and implement monitoring and evaluation plan

Partners: SNS, ISAR, DVC and Farmer Seed Grower Associations

| Activity 2.4  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|--------|--------|--------|--------|--------|
| Acquire and install quality control equipment   | ■      |        |        |        |        |
| M.Sc. training for SNS Head of Quality Control Lab  | ■      | ■      | ■      |        |        |
| Short course training for quality control staff   | ■      | ■      |        |        |        |
| Design of inspection and control procedures   | ■      |        |        |        |        |
| Implement inspection and quality control for potato seed certification in Ruhengeri and Gisenyi Provinces |        | ■      | ■      | ■      | ■      |
| Design quality seed marketing program for potato  | ■      |        |        |        |        |
| Implement marketing program   |        | ■      | ■      | ■      | ■      |
| Monitoring and Evaluation   |        | ■      |        | ■      | ■      |

### Activity 3.1: Farmer Training

Goal: Farmers achieve higher yields through improved crop and soil management

Objectives:

1. Train 40,000 farmers in potato crop and soil management



|                        |   |                      |  |   |  |
|------------------------|---|----------------------|--|---|--|
| Identify organizations | █ |                      |  |   |  |
| Conduct training       |   | ████████████████████ |  |   |  |
| Monitor and Evaluate   |   | █                    |  | █ |  |

### Activity 3.3: Production credit for farmers

Goal: Increase farmer use of inputs through provision of production credit

Outputs:

1. Farmer credit use is 30% among members of farmer organizations in Ruhengeri and Gisenyi
2. Farmers are trained in credit use

Methods:

1. Design criteria of lending program, identify possible lending organizations, establish credit funds in them and open the credit fund for lending
2. Train farmers and farm organizations on credit use and management
3. Promote credit use among farmer organizations
4. Monitor and evaluate progress of credit program

Participants: PDMAR (or its successor), Banque Populaire, Farmer organizations, Farmer unions

| Activity 3.3                        | Year 1   | Year 2 | Year 3 | Year 4 | Year 5 |
|-------------------------------------|--|--------|--------|--------|--------|
| Establish credit funds with lenders | █  |        |        |        |        |
| Train farmers on credit use         | ████████████████████   |        |        |        |        |
| Promote credit use                  | ██   |        |        |        |        |
| Maintain credit line open           | ██ |        |        |        |        |
| Monitor and evaluate                |  | █      |        | █      | █      |

### Activity 4.1: Re-organizing wholesale potato markets

Goal: Improved performance of wholesale potato markets in Rwanda

Outputs:

1. Re-organization of wholesale markets in Kigali
2. Improvement of Kigali wholesale market facilities
3. Re-organization of selected important wholesale markets in Ruhengeri and Gisenyi provinces

Methods:

1. Establish and maintain contact with wholesaler groups in Kigali and Ruhengeri and Gisenyi provinces
2. Using participatory methods develop plan for market re-organization in Kigali
3. Design and construct improved wholesale market facilities in Kigali



**Budget Notes:**

These budgets are very preliminary and need specific adjustments for real costs for example for local hire personnel, vehicle insurance, internal per diem rates and so on. Inflation costs are not built into the budgets and should be. Estimates from the finance ministry should be obtained and used for this calculation.

The 11 activity budgets are divided into two parts: operations and management. The operations part is divided into specific outputs. The funds assigned to the outputs are for both operations and for capital investments. The operations component may have personnel, services, supplies and travel components. The management part is divided into the costs of coordination and monitoring and evaluation.

Activities for sub-program 3 and 4.1 will be executed as a component of the larger PDMAR program or its successor. Thus the coordination and management components are reduced and costs will be shared with the larger overall PDMAR program.

**Personnel:**

There are two international advisors included among the 11 activities. These advisors will work in most of the projects. One advisor is assigned to lead the value chain activity and will also take responsibility for the processing promotion activity and liaise with the training and market re-organization activities. The second advisor is assigned to the variety introduction activity and will also take responsibility for the other activities in sub-program 2. Both should probably be posted with ISAR in Ruhengeri.

Most activities have a local hire coordinator. These individuals will oversee the day-to-day operation of the specific activity in under the supervision of the Rwandan director of the particular institution where he or she is assigned and the international advisor.

**Capital:**

Several of the activities require capital investments. These include the expansion of the in vitro laboratory and construction of screenhouses at the ISAR Ruhengeri station and wholesale potato markets in various cities. Equipment is also needed. This includes computers for the coordinators for the activities, and vehicles for those coordinators whose job description requires travel. ISAR and SNS also require various types of laboratory equipment to manage the expansion in production of seed potatoes and the associated quality testing that supports it.

**Travel:**

The travel budgets include both international and domestic travel. The international advisors and other participants have a limited international travel budget to facilitate their attendance in regional events that may further their professional development. The local travel budgets are for movement around the country for facilitation of particular activities.

**Training :**

M.Sc. training for four agricultural professionals is funded in activities 2.1 and 2.2 and short course training for professionals for many more.

**Activity1.1**

The operations costs for the three outputs represent funds used to stimulate the formation, consolidation and growth of the value chain as an entity in Rwanda around which the participants can gather for both technical support and as a platform for communication to the other stakeholders. The operations in the third output are specifically designed as funds to stimulate development of new value added enterprises and are should be available to any participant in the chain. This activity also has a steering committee. This steering committee provides policy direction for the international advisor and is constituted from among participants in the value chain. This is the only activity in which a steering committee is contemplated.

**Activities 2.2 and 2.3**

An objective of the basic and certified seed production activities is to promote financial self-sustainability for ISAR, SNS and the farmer seed grower associations. Thus the on-going operations costs for these activities represent not the actual costs of producing that volume of seed but rather a source of financial backstopping and support past key bottlenecks as these institutions reach financial maturity.

**Activity 3.1**

The contract with participating lending organizations will cover the bank operations costs and these will be part of the initial capital endowment. Thus the on-going operations costs are low.

## Participants at the initial workshop for the potato-sector action plan on 6th August 2002

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Draft Budget: Potato Sector Development Program

| Activities                               | Year 1           | Year 2           | Year 3         | Year 4         | Year 5         | TOTAL            |
|--|------------------|------------------|----------------|----------------|----------------|------------------|
| Subprogram 1 Value Chain                 | (US\$)           | (US\$)           | (US\$)         | (US\$)         | (US\$)         | (US\$)           |
| Activity 1.1                             | 192,000          | 175,000          | 182,000        | 182,000        | 180,000        | 911,000          |
| Activity 1.2                             | 45,500           | 40,500           | 40,500         | 40,500         | 40,500         | 207,500          |
| Subtotal                                 | 237,500          | 215,500          | 222,500        | 222,500        | 220,500        | 1,118,500        |
| Subprogram 2 Varieties and Seed          |                  |                  |                |                |                |                  |
| Activity 2.1                             | 207,000          | 187,000          | 208,000        | 198,000        | 198,000        | 998,000          |
| Activity 2.2                             | 309,000          | 179,000          | 91,000         | 81,000         | 61,000         | 721,000          |
| Activity 2.3                             | 33,000           | 34,000           | 23,000         | 23,000         | 20,000         | 133,000          |
| Activity 2.4                             | 113,000          | 83,000           | 58,000         | 48,000         | 46,000         | 348,000          |
| Subtotal                                 | 662,000          | 483,000          | 380,000        | 350,000        | 325,000        | 2,200,000        |
| Subprogram 3 Farmer Training and Support |                  |                  |                |                |                |                  |
| Activity 3.1                             | 241,000          | 226,000          | 177,000        | 177,000        | 147,000        | 968,000          |
| Activity 3.2                             | 87,000           | 67,000           | 37,000         | -              | 1,000          | 192,000          |
| Activity 3.3                             | 613,000          | 13,000           | 3,000          | 3,000          | 3,000          | 635,000          |
| Subtotal                                 | 941,000          | 306,000          | 217,000        | 180,000        | 151,000        | 1,795,000        |
| Subprogram 4 Market Development          |                  |                  |                |                |                |                  |
| Activity 4.1                             | 136,000          | 26,000           | 16,000         | 16,000         | 16,000         | 210,000          |
| Activity 4.2                             | 21,500           | 21,500           | 21,500         | 6,500          | -              | 71,000           |
| Subtotal                                 | 157,500          | 47,500           | 37,500         | 22,500         | 16,000         | 281,000          |
| <b>Total</b>                             | <b>1,998,000</b> | <b>1,052,000</b> | <b>857,000</b> | <b>775,000</b> | <b>712,500</b> | <b>5,394,500</b> |

| Activity 1.1 Value Chain Development           | Year 1         | Year 2         | Year 3         | Year 4         | Year 5         | TOTAL          |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
|  | (US\$)         | (US\$)         | (US\$)         | (US\$)         | (US\$)         | (US\$)         |
| <b>1 Output 1: National Agenda</b>             | <b>9,000</b>   | <b>10,000</b>  | <b>11,000</b>  | <b>11,000</b>  | <b>9,000</b>   | <b>50,000</b>  |
| Operating costs                                | 6,000          | 6,000          | 7,000          | 7,000          | 6,000          | 6,000          |
| Meetings                                       | 3,000          | 4,000          | 4,000          | 4,000          | 3,000          | 3,000          |
| <b>2 Output 2: Institutional Development</b>   | <b>6,000</b>   | <b>6,000</b>   | <b>6,000</b>   | <b>6,000</b>   | <b>6,000</b>   | <b>30,000</b>  |
| Operating costs                                | 6,000          | 6,000          | 6,000          | 6,000          | 6,000          | 6,000          |
| <b>3 Output 3: Improved technical capacity</b> | <b>15,000</b>  | <b>20,000</b>  | <b>25,000</b>  | <b>25,000</b>  | <b>10,000</b>  | <b>95,000</b>  |
| Operating costs                                | 5,000          | 5,000          | 5,000          | 5,000          | 5,000          | 5,000          |
| Promotion funds                                | 10,000         | 15,000         | 20,000         | 20,000         | 5,000          | 5,000          |
| <b>4 Coordination and management</b>           | <b>162,000</b> | <b>139,000</b> | <b>140,000</b> | <b>140,000</b> | <b>155,000</b> | <b>736,000</b> |
| <b>4.1. Personnel and Travel</b>               | <b>126,000</b> | <b>126,000</b> | <b>126,000</b> | <b>126,000</b> | <b>141,000</b> | <b>736,000</b> |
| International advisor (also in activity 4.2)   | 115,000        | 115,000        | 115,000        | 115,000        | 115,000        | 115,000        |
| Repatriation                                   |                |                |                |                | 15,000         | 15,000         |
| Administrative assistant (part time)           | 6,000          | 6,000          | 6,000          | 6,000          | 6,000          | 6,000          |
| Travel   | 5,000          | 5,000          | 5,000          | 5,000          | 5,000          | 5,000          |
| <b>4.2. Office and vehicle</b>                 | <b>35,000</b>  | <b>11,000</b>  | <b>12,000</b>  | <b>12,000</b>  | <b>12,000</b>  | <b>12,000</b>  |
| Equipment and materials                        | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          |
| Services (communication and maintenance)       | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          |
| Transport costs                                | 2,000          | 2,000          | 2,000          | 2,000          | 2,000          | 2,000          |
| Computer                                       | 4,000          |                |                |                |                |                |
| Vehicle  | 20,000         |                |                |                |                |                |
| Insurance and maintenance                      | 3,000          | 3,000          | 4,000          | 4,000          | 4,000          | 4,000          |
| <b>4.3. Monitoring and Evaluation</b>          | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   |
| Monitoring and Evaluation                      | 1,000          | 1,000          | 1,000          | 1,000          | 1,000          | 1,000          |
| <b>4.4. Planning: Directorate</b>              | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   |
| Steering committee                             | 1,000          | 1,000          | 1,000          | 1,000          | 1,000          | 1,000          |
| <b>TOTAL Activity 1.1</b>                      | <b>192,000</b> | <b>175,000</b> | <b>182,000</b> | <b>182,000</b> | <b>180,000</b> | <b>911,000</b> |

| <b>Activity 1.2 Market Price System</b>    | <b>Year 1</b>        | <b>Year 2</b>        | <b>Year 3</b>        | <b>Year 4</b>        | <b>Year 5</b>        | <b>TOTAL</b>          |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| <b>1 Output 1 Price Information System</b> | (US\$) <b>20,000</b> | (US\$) <b>100,000</b> |
| Operating costs                            | 20,000               | 20,000               | 20,000               | 20,000               | 20,000               |                       |
| <b>2 Coordination and management</b>       | <b>25,500</b>        | <b>20,500</b>        | <b>20,500</b>        | <b>20,500</b>        | <b>20,500</b>        | <b>107,500</b>        |
| <b>2.1 Personnel and Travel</b>            | <b>14,000</b>        | <b>14,000</b>        | <b>14,000</b>        | <b>14,000</b>        | <b>14,000</b>        |                       |
| Coordinator                                | 12,000               | 12,000               | 12,000               | 12,000               | 12,000               |                       |
| Travel                                     | 2,000                | 2,000                | 2,000                | 2,000                | 2,000                |                       |
| <b>2.2 Office and vehicle</b>              | <b>11,000</b>        | <b>6,000</b>         | <b>6,000</b>         | <b>6,000</b>         | <b>6,000</b>         |                       |
| Equipment and materials                    | 3,000                | 3,000                | 3,000                | 3,000                | 3,000                |                       |
| Services (communication and maintenance)   | 3,000                | 3,000                | 3,000                | 3,000                | 3,000                |                       |
| Computer and fax                           | 5,000                |                      |                      |                      |                      |                       |
| <b>2.3 Monitoring and Evaluation</b>       | <b>500</b>           | <b>500</b>           | <b>500</b>           | <b>500</b>           | <b>500</b>           |                       |
| Monitoring and Evaluation                  | 500                  | 500                  | 500                  | 500                  | 500                  |                       |
| <b>TOTAL Activity 1.2</b>                  | <b>45,500</b>        | <b>40,500</b>        | <b>40,500</b>        | <b>40,500</b>        | <b>40,500</b>        | <b>207,500</b>        |

| Activity 2.1 Variety Introduction                | Year 1         | Year 2         | Year 3         | Year 4         | Year 5         | TOTAL          |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
|  | (US\$)         | (US\$)         | (US\$)         | (US\$)         | (US\$)         | (US\$)         |
| <b>1 Output 1 Variety Selection</b>              | <b>22,000</b>  | <b>22,000</b>  | <b>22,000</b>  | <b>22,000</b>  | <b>22,000</b>  | <b>110,000</b> |
| Operating costs                                  | 20,000         | 20,000         | 20,000         | 20,000         | 20,000         |                |
| Meetings   | 2,000          | 2,000          | 2,000          | 2,000          | 2,000          |                |
| <b>2 Output 2 Seed Multiplication</b>            | <b>-</b>       | <b>-</b>       | <b>10,000</b>  | <b>10,000</b>  | <b>10,000</b>  | <b>30,000</b>  |
| Operating costs                                  |                |                | 10,000         | 10,000         | 10,000         |                |
| <b>3 Output 3 Training</b>                       | <b>30,000</b>  | <b>30,000</b>  | <b>40,000</b>  | <b>30,000</b>  | <b>15,000</b>  | <b>145,000</b> |
| MS Tuition (2 students)                          | 20,000         | 20,000         | 30,000         | 20,000         | 10,000         |                |
| Student Support                                  | 10,000         | 10,000         | 10,000         | 10,000         | 5,000          |                |
| <b>4 Coordination and management</b>             | <b>155,000</b> | <b>135,000</b> | <b>136,000</b> | <b>136,000</b> | <b>151,000</b> | <b>713,000</b> |
| <b>4.1. Personnel and Travel</b>                 | <b>123,000</b> | <b>123,000</b> | <b>123,000</b> | <b>123,000</b> | <b>138,000</b> | <b>138,000</b> |
| International advisor (also in Activity 2.2,2.3) | 115,000        | 115,000        | 115,000        | 115,000        | 115,000        |                |
| Repatriation                                     |                |                |                |                | 15,000         |                |
| Travel   | 8,000          | 8,000          | 8,000          | 8,000          | 8,000          |                |
| <b>4.2. Office and vehicle</b>                   | <b>31,000</b>  | <b>11,000</b>  | <b>12,000</b>  | <b>12,000</b>  | <b>12,000</b>  | <b>12,000</b>  |
| Equipment and materials                          | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          |                |
| Services (communication and maintenance)         | 3,000          | 3,000          | 3,000          | 3,000          | 3,000          |                |
| Transport costs                                  | 2,000          | 2,000          | 2,000          | 2,000          | 2,000          |                |
| Vehicle  | 20,000         |                |                |                |                |                |
| Insurance and maintenance                        | 3,000          | 3,000          | 4,000          | 4,000          | 4,000          |                |
| <b>4.3. Monitoring and Evaluation</b>            | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   | <b>1,000</b>   |
| Monitoring and Evaluation                        | 1,000          | 1,000          | 1,000          | 1,000          | 1,000          |                |
| <b>TOTAL Activity 2.1</b>                        | <b>207,000</b> | <b>187,000</b> | <b>208,000</b> | <b>198,000</b> | <b>198,000</b> | <b>998,000</b> |

| Activity 2.2 Basic Seed Production           | Year 1                | Year 2               | Year 3               | Year 4               | Year 5               | TOTAL                 |
|--|-----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| <b>1 Output 1 Foundation Seed</b>            | (US\$) <b>190,000</b> | (US\$) <b>60,000</b> | (US\$) <b>20,000</b> | (US\$) <b>20,000</b> | (US\$) <b>20,000</b> | (US\$) <b>310,000</b> |
| Operating costs                              | 20,000                | 20,000               | 20,000               | 20,000               | 20,000               |                       |
| Laboratory and Screenhouse construction      | 120,000               | 20,000               |                      |                      |                      |                       |
| Equipment                                    | 50,000                | 20,000               |                      |                      |                      |                       |
| <b>2 Output 2 Basic Seed</b>                 | <b>20,000</b>         | <b>20,000</b>        | <b>20,000</b>        | <b>20,000</b>        | <b>20,000</b>        | <b>100,000</b>        |
| Operating costs                              | 20,000                | 20,000               | 20,000               | 20,000               | 20,000               |                       |
| <b>3 Output 3 Training</b>                   | <b>60,000</b>         | <b>80,000</b>        | <b>30,000</b>        | <b>20,000</b>        | <b>-</b>             | <b>190,000</b>        |
| MS Tuition (2 students)                      | 40,000                | 40,000               | 20,000               | -                    | -                    |                       |
| Student Support (2 students)                 | 20,000                | 20,000               | 10,000               | -                    | -                    |                       |
| Short courses                                |                       | 20,000               |                      | 20,000               |                      |                       |
| <b>4 Coordination and management</b>         | <b>39,000</b>         | <b>19,000</b>        | <b>21,000</b>        | <b>21,000</b>        | <b>21,000</b>        | <b>121,000</b>        |
| <b>4.1. Personnel and Travel</b>             | <b>38,000</b>         | <b>18,000</b>        | <b>20,000</b>        | <b>20,000</b>        | <b>20,000</b>        |                       |
| International advisor (cost in activity 2.1) |                       |                      |                      |                      |                      |                       |
| Assistant                                    | 12,000                | 12,000               | 12,000               | 12,000               | 12,000               |                       |
| Travel                                       | 3,000                 | 3,000                | 4,000                | 4,000                | 4,000                |                       |
| Vehicle                                      | 20,000                |                      |                      |                      |                      |                       |
| Insurance and Maintenance                    | 3,000                 | 3,000                | 4,000                | 4,000                | 4,000                |                       |
| <b>4.3. Monitoring and Evaluation</b>        | <b>1,000</b>          | <b>1,000</b>         | <b>1,000</b>         | <b>1,000</b>         | <b>1,000</b>         |                       |
| Monitoring and Evaluation                    | 1,000                 | 1,000                | 1,000                | 1,000                | 1,000                |                       |
| <b>TOTAL Activity 2.2</b>                    | <b>309,000</b>        | <b>179,000</b>       | <b>91,000</b>        | <b>81,000</b>        | <b>61,000</b>        | <b>721,000</b>        |

| <b>Activity 2.3 Certified Seed Production</b> | <b>Year 1</b> | <b>Year 2</b> | <b>Year 3</b> | <b>Year 4</b> | <b>Year 5</b> | <b>TOTAL</b>   |
|---|---------------|---------------|---------------|---------------|---------------|----------------|
|   | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)         |
| <b>1 Output 1 Certified Seed</b>              | <b>6,000</b>  | <b>7,000</b>  | <b>6,000</b>  | <b>6,000</b>  | <b>5,000</b>  | <b>30,000</b>  |
| Operating costs                               | 6,000         | 7,000         | 6,000         | 6,000         | 5,000         |                |
| <b>2 Output 2 Training</b>                    | <b>10,000</b> | <b>10,000</b> | <b>-</b>      | <b>-</b>      | <b>-</b>      | <b>20,000</b>  |
| Short courses                                 | 10,000        | 10,000        |               |               |               |                |
| <b>3 Coordination and management</b>          | <b>17,000</b> | <b>17,000</b> | <b>17,000</b> | <b>17,000</b> | <b>15,000</b> | <b>83,000</b>  |
| <b>3.1 Personnel and Travel</b>               | <b>16,000</b> | <b>16,000</b> | <b>16,000</b> | <b>16,000</b> | <b>14,000</b> |                |
| International advisor (cost in activity 2.1)  |               |               |               |               |               |                |
| Assistant                                     | 12,000        | 12,000        | 12,000        | 12,000        | 12,000        |                |
| Travel  | 4,000         | 4,000         | 4,000         | 4,000         | 2,000         |                |
| <b>3.2 Monitoring and Evaluation</b>          | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  |                |
| Monitoring and Evaluation                     | 1,000         | 1,000         | 1,000         | 1,000         | 1,000         |                |
| <b>TOTAL Activity 2.3</b>                     | <b>33,000</b> | <b>34,000</b> | <b>23,000</b> | <b>23,000</b> | <b>20,000</b> | <b>133,000</b> |

| <b>Activity 2.4 Seed Law Implementation</b>  | <b>Year 1</b>  | <b>Year 2</b> | <b>Year 3</b> | <b>Year 4</b> | <b>Year 5</b> | <b>TOTAL</b>   |
|--|----------------|---------------|---------------|---------------|---------------|----------------|
|  | (US\$)         | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)         |
| <b>1 Output 1 Seed Inspection</b>            | <b>20,000</b>  | <b>30,000</b> | <b>20,000</b> | <b>10,000</b> | <b>10,000</b> | <b>90,000</b>  |
| Operating costs                              | 10,000         | 20,000        | 20,000        | 10,000        | 10,000        |                |
| Training (short courses for SNS staff)       | 10,000         | 10,000        |               |               |               |                |
| <b>2 Output 2 Quality Control</b>            | <b>45,000</b>  | <b>25,000</b> | <b>10,000</b> | <b>10,000</b> | <b>8,000</b>  | <b>98,000</b>  |
| Operating costs                              | 10,000         | 15,000        | 10,000        | 10,000        | 8,000         |                |
| Quality testing equipment                    | 25,000         |               |               |               |               |                |
| Training (short courses for SNS staff)       | 10,000         | 10,000        |               |               |               |                |
| <b>3 Seed Law Public Awareness</b>           | <b>10,000</b>  | <b>10,000</b> | <b>10,000</b> | <b>10,000</b> | <b>10,000</b> | <b>50,000</b>  |
| Operating costs                              | 10,000         | 10,000        | 10,000        | 10,000        | 10,000        |                |
| <b>3 Coordination and management</b>         | <b>38,000</b>  | <b>18,000</b> | <b>18,000</b> | <b>18,000</b> | <b>18,000</b> | <b>110,000</b> |
| <b>3.1 Personnel and Travel</b>              | <b>37,000</b>  | <b>17,000</b> | <b>17,000</b> | <b>17,000</b> | <b>17,000</b> |                |
| International advisor (cost in activity 2.1) |                |               |               |               |               |                |
| Assistant                                    | 12,000         | 12,000        | 12,000        | 12,000        | 12,000        |                |
| Travel                                       | 2,000          | 2,000         | 2,000         | 2,000         | 2,000         |                |
| Vehicle                                      | 20,000         |               |               |               |               |                |
| Insurance and Maintenance                    | 3,000          | 3,000         | 3,000         | 3,000         | 3,000         |                |
| <b>3.2 Monitoring and Evaluation</b>         | <b>1,000</b>   | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  |                |
| Monitoring and Evaluation                    | 1,000          | 1,000         | 1,000         | 1,000         | 1,000         |                |
| <b>TOTAL Activity 2.4</b>                    | <b>113,000</b> | <b>83,000</b> | <b>58,000</b> | <b>48,000</b> | <b>46,000</b> | <b>348,000</b> |

| <b>Activity 3.1 Farmer Training</b>       | <b>Year 1</b>         | <b>Year 2</b>         | <b>Year 3</b>         | <b>Year 4</b>         | <b>Year 5</b>         | <b>TOTAL</b>          |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <b>1 Output 1 Farmer Training Program</b> | (US\$) <b>190,000</b> | (US\$) <b>200,000</b> | (US\$) <b>150,000</b> | (US\$) <b>150,000</b> | (US\$) <b>120,000</b> | (US\$) <b>810,000</b> |
| Production training materials             | 40,000                |                       |                       |                       |                       |                       |
| Training farmer trainers                  | 100,000               | 100,000               | 50,000                | 50,000                | 20,000                |                       |
| Farmer-led training                       | 50,000                | 100,000               | 100,000               | 100,000               | 100,000               |                       |
| <b>2 Coordination and management</b>      | <b>51,000</b>         | <b>26,000</b>         | <b>27,000</b>         | <b>27,000</b>         | <b>27,000</b>         | <b>158,000</b>        |
| <b>2.1 Personnel and Travel</b>           | <b>16,000</b>         | <b>16,000</b>         | <b>16,000</b>         | <b>16,000</b>         | <b>16,000</b>         |                       |
| Coordinator (shared with PDMAR project)   | 12,000                | 12,000                | 12,000                | 12,000                | 12,000                |                       |
| Travel                                    | 4,000                 | 4,000                 | 4,000                 | 4,000                 | 4,000                 |                       |
| <b>2.2 Office and vehicle</b>             | <b>34,000</b>         | <b>9,000</b>          | <b>10,000</b>         | <b>10,000</b>         | <b>10,000</b>         |                       |
| Equipment and materials                   | 3,000                 | 3,000                 | 3,000                 | 3,000                 | 3,000                 |                       |
| Services (communication and maintenance)  | 3,000                 | 3,000                 | 3,000                 | 3,000                 | 3,000                 |                       |
| Computer and fax                          | 5,000                 |                       |                       |                       |                       |                       |
| Vehicle                                   | 20,000                |                       |                       |                       |                       |                       |
| Vehicle Insurance and Maintenance         | 3,000                 | 3,000                 | 4,000                 | 4,000                 | 4,000                 |                       |
| <b>2.3 Monitoring and Evaluation</b>      | <b>1,000</b>          | <b>1,000</b>          | <b>1,000</b>          | <b>1,000</b>          | <b>1,000</b>          |                       |
| Monitoring and Evaluation                 | 1,000                 | 1,000                 | 1,000                 | 1,000                 | 1,000                 |                       |
| <b>TOTAL Activity 3.1</b>                 | <b>241,000</b>        | <b>226,000</b>        | <b>177,000</b>        | <b>177,000</b>        | <b>147,000</b>        | <b>968,000</b>        |

| <b>Activity 3.2 Farmer Organization Training</b> |               |               |               |               |               |                |
|--|---------------|---------------|---------------|---------------|---------------|----------------|
|  | <b>Year 1</b> | <b>Year 2</b> | <b>Year 3</b> | <b>Year 4</b> | <b>Year 5</b> | <b>TOTAL</b>   |
|  | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)         |
| <b>1 Output 1 Farmer Organization Training</b>   | <b>70,000</b> | <b>50,000</b> | <b>20,000</b> | <b>-</b>      | <b>-</b>      | <b>140,000</b> |
| Production training materials                    | 20,000        |               |               |               |               |                |
| Training   | 50,000        | 50,000        | 20,000        |               |               |                |
| <b>2 Coordination and management</b>             | <b>17,000</b> | <b>17,000</b> | <b>17,000</b> | <b>-</b>      | <b>1,000</b>  | <b>52,000</b>  |
| <b>2.1 Personnel and Travel</b>                  | <b>16,000</b> | <b>16,000</b> | <b>16,000</b> | <b>-</b>      | <b>-</b>      |                |
| Coordinator (shared with PDMAR)                  | 12,000        | 12,000        | 12,000        |               |               |                |
| Travel   | 4,000         | 4,000         | 4,000         |               |               |                |
| <b>2.3 Monitoring and Evaluation</b>             | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | <b>-</b>      | <b>1,000</b>  |                |
| Monitoring and Evaluation                        | 1,000         | 1,000         | 1,000         |               |               |                |
| <b>TOTAL Activity 3.1</b>                        | <b>87,000</b> | <b>67,000</b> | <b>37,000</b> | <b>-</b>      | <b>1,000</b>  | <b>192,000</b> |

| <b>Activity 3.3 Production Credit</b>       | <b>Year 1</b>  | <b>Year 2</b> | <b>Year 3</b> | <b>Year 4</b> | <b>Year 5</b> | <b>TOTAL</b>   |
|---|----------------|---------------|---------------|---------------|---------------|----------------|
| <b>1 Output 1 Credit line</b>               | (US\$)         | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)         |
| Operating costs                             | 600,000        | -             | -             | -             | -             | 600,000        |
| <b>2 Output 2 Training</b>                  | 10,000         | 10,000        | -             | -             | -             | 20,000         |
| Short courses                               | 10,000         | 10,000        | -             | -             | -             |                |
| <b>3 Coordination and management</b>        | 3,000          | 3,000         | 3,000         | 3,000         | 3,000         | 15,000         |
| <b>3.1 Personnel and Travel</b>             | 2,000          | 2,000         | 2,000         | 2,000         | 2,000         |                |
| Coordination (cost shared in PDMAR project) |                |               |               |               |               |                |
| Travel                                      | 2,000          | 2,000         | 2,000         | 2,000         | 2,000         |                |
| <b>3.2 Monitoring and Evaluation</b>        | 1,000          | 1,000         | 1,000         | 1,000         | 1,000         |                |
| Monitoring and Evaluation                   | 1,000          | 1,000         | 1,000         | 1,000         | 1,000         |                |
| <b>TOTAL Activity 3.3</b>                   | <b>613,000</b> | <b>13,000</b> | <b>3,000</b>  | <b>3,000</b>  | <b>3,000</b>  | <b>635,000</b> |

| Activity 4.1 Wholesale market re-organization      | Year 1         | Year 2        | Year 3        | Year 4        | Year 5        | TOTAL          |
|--|----------------|---------------|---------------|---------------|---------------|----------------|
| <b>1 Output 1 Kigali Market Reorganization</b>     | (US\$)         | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)         |
| Operating costs                                    | 10,000         | 10,000        | -             | -             | -             | 20,000         |
| 10,000   |                |               |               |               |               |                |
| <b>2 Output 2 Kigali market construction</b>       | 100,000        | -             | -             | -             | -             | 100,000        |
| Construction                                       | 100,000        |               |               |               |               |                |
| <b>3 Output 3 Provincial market reorganization</b> | 10,000         | 20,000        | 20,000        | 20,000        | 10,000        | 80,000         |
| Operating costs                                    | 10,000         | 20,000        | 20,000        | 20,000        | 10,000        |                |
| <b>4 Coordination and management</b>               | 16,000         | 16,000        | 16,000        | 16,000        | 16,000        | 80,000         |
| <b>4.1 Personnel and Travel</b>                    | 15,000         | 15,000        | 15,000        | 15,000        | 15,000        |                |
| Coordinator (share with PDMAR project)             | 12,000         | 12,000        | 12,000        | 12,000        | 12,000        |                |
| Travel   | 3,000          | 3,000         | 3,000         | 3,000         | 3,000         |                |
| <b>4.2 Monitoring and Evaluation</b>               | 1,000          | 1,000         | 1,000         | 1,000         | 1,000         |                |
| Monitoring and Evaluation                          | 1,000          | 1,000         | 1,000         | 1,000         | 1,000         |                |
| <b>TOTAL Activity 4.1</b>                          | <b>136,000</b> | <b>26,000</b> | <b>16,000</b> | <b>16,000</b> | <b>16,000</b> | <b>210,000</b> |

| <b>Activity 4.2 Processing Promotion</b> | <b>Year 1</b> | <b>Year 2</b> | <b>Year 3</b> | <b>Year 4</b> | <b>Year 5</b> | <b>TOTAL</b>  |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
|  | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)        | (US\$)        |
| <b>1 Output 1 Processing Promotion</b>   | <b>20,000</b> | <b>20,000</b> | <b>20,000</b> | <b>5,000</b>  | -             | <b>65,000</b> |
| Operating costs                          | 20,000        | 20,000        | 20,000        | 5,000         | -             |               |
| <b>2 Coordination and management</b>     | <b>1,500</b>  | <b>1,500</b>  | <b>1,500</b>  | <b>1,500</b>  | -             | <b>6,000</b>  |
| <b>2.1 Personnel and Travel</b>          | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | <b>1,000</b>  | -             |               |
| Coordinator (costs shared with 1.1)      | 1,000         | 1,000         | 1,000         | 1,000         | -             |               |
| Travel                                   |               |               |               |               |               |               |
| <b>2.3 Monitoring and Evaluation</b>     | <b>500</b>    | <b>500</b>    | <b>500</b>    | <b>500</b>    | -             |               |
| Monitoring and Evaluation                | 500           | 500           | 500           | 500           | -             |               |
| <b>TOTAL Activity 4.2</b>                | <b>21,500</b> | <b>21,500</b> | <b>21,500</b> | <b>6,500</b>  | -             | <b>71,000</b> |